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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,419	03/07/2002	Marten Armgarth	003300-761	8888

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EXAMINER

CIESLEWICZ, ANETA B

ART UNIT PAPER NUMBER

2814

DATE MAILED: 12/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/091,419

Applicant(s)

ARMGARTH ET AL.

Examiner

Aneta B. Cieslewicz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/7/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 and 31-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-8,10-17,19-21 and 31 is/are rejected.
- 7) ☒ Claim(s) 2,3,9,18,22-29 and 32-35 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 22 is objected to because no steps are recited for the method being claimed. The following changes are suggested to the claim language: “A method of producing a supported electrochemical transistor device comprising the steps of: forming source contact, forming a drain contact, forming at least one gate electrode, forming an electrochemically active element arranged between, and in direct electrical contact with the source and drain contacts, wherein electrochemically active element comprises a transistor channel and is made of a material comprising an organic material having the ability of electrochemically altering its conductivity through change of redox state thereof, and forming a solidified electrolyte in direct electrical contact with the electrochemically active element and said at least one gate electrode and interposed between them in such a way that electron flow between the electrochemically active element and said gate electrode(s) is prevented, wherein the said contacts, electrode(s), electrochemically active element and electrolyte are deposited directly onto a support.”
2. Claims 25 and 32 are objected to because the claim language is not clear. The following changes are suggested to the claim language for clarification purposes: “A process according to claim 22, in which said organic material comprises a polymer, wherein the polymer is deposited on the support through in situ polymerization.”
3. Claim 29 is objected to because of incorrect Markush grouping. The proper Markush group language should recite members as being “selected from the group consisting of” - see MPEP 2173.05 (h).

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, it is not clear what are the derivatives of poly(3,4-ethylenedioxythiophene), poly(3,4-ethylenedioxythiophene), poly(3,4-propylenedioxythiophene), poly(3,4-butylenedioxythiophene). Furthermore, the phrase “copolymers therewith” is not clear since copolymers are already being claimed directly above.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1,4-6,8,10,11,16, 19-21 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Duthaler et al., US 2002/0053320 A1.

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Re claim 1, Duthaler et al. disclose a supported or self supporting electrochemical transistor device comprising: a source contact (40), a drain contact (42), at least one gate electrode (34), an electrochemically active element arranged between (38), and in direct electrical contact with, the source and drain contacts, wherein electrochemically active element comprises a transistor channel and is of a material comprising an organic material (i.e. page 2, ¶38) having the ability of electrochemically altering its conductivity through change of redox state thereof, and a solidified electrolyte (dielectric) (36) in direct electrical contact with the electrochemically active element and said at least one gate electrode and interposed between them (i.e. Figure 1b). In the device disclosed by Duthaler et al. the electron flow between the electrochemically active element and said gate electrode(s) is inherently prevented and the flow of electrons between source contact and drain contact is inherently controllable by means of a voltage applied to said gate electrode(s).

Re claim 4, in the electrochemical transistor disclosed by Duthaler et al., gate electrode is formed from the same material as the electrochemically active element (i.e. page 2, ¶36).

Re claim 5, in the electrochemical transistor disclosed by Duthaler et al., source, drain and gate electrodes are formed from the same material as the electrochemically active element (i.e. page 2, ¶36).

Re claim 6, in the electrochemical transistor disclosed by Duthaler et al., since the source and drain contacts and the electrochemically active element are formed from the same material they are inherently formed from a continuous piece of material (i.e. see Figure 1b and page 2, ¶36 and ¶38).

Re claim 7, since the electrochemical transistor device disclosed by Duthaler et al. includes all the limitations claimed, then the transistor channel inherently retains its redox state upon removal of the gate voltage.

Re claim 8, since the electrochemical transistor device disclosed by Duthaler et al. includes all the limitations claimed, then the transistor channel inherently spontaneously returns to its initial redox state upon removal of the gate voltage.

Re claim 10, in the electrochemical transistor disclosed by Duthaler et al. the organic material is a polymer (i.e. page 2, ¶38).

Re claim 11, in the electrochemical transistor disclosed by Duthaler et al. the polymer material is polythiophenes (i.e. page 2, ¶38).

Re claim 16, in the electrochemical transistor disclosed by Duthaler et al. the solidified electrolyte (dielectric) comprises a binder (i.e. page 2, ¶37).

Re claim 19, the electrochemical transistor disclosed by Duthaler et al. is self-supporting (page 2, ¶35).

Re claim 20, the electrochemical transistor disclosed by Duthaler et al. is arranged on a support (i.e. Figure 1B and page 2, ¶35).

Re claim 21, in the electrochemical transistor disclosed by Duthaler et al. the support is made of polyethylene terephthalate (i.e. page 2, ¶35).

Re claim 31, in the device disclosed by Duthaler et al, the source and drain contacts and the electrochemically active element are inherently formed from a continuous piece of said material comprising an organic material (i.e. see Figure 1b and page 2, ¶36 and ¶38).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 12 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Duthaler et al., US 2002/0053320 A1 in view of Kvarnstrom et al.

The electrochemical transistor disclosed by Duthaler et al. includes all the limitations claimed except that that the electrochemically active element is a polymer or copolymer of a 3,4-dialkoxythiophene and is selected from the group consisting of poly(3,4-methylenedioxythiophene), poly(3,4-methylenedioxythiophene) derivatives, poly(3,4-ethylenedioxythiophene), poly(3,4-ethylenedioxythiophene) derivatives, poly(3,4-propylenedioxythiophene), poly(3,4-propylenedioxythiophene) derivatives, poly(3,4-butylenedioxythiophene), poly(3,4-butylenedioxythiophene) derivatives, and copolymers therewith. Kvarnstrom et al. disclose poly(3,4-ethylenedioxythiophene) as a semiconducting organic material suitable for use in electronic devices. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the electrochemical transistor disclosed by Duthaler et al. to include the poly(3,4-ethylenedioxythiophene) layer as disclosed by Kvarnstrom et al. as an active in order to improve performance of the device (i.e. page 2739).

7. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duthaler et al., US 2002/0053320 A1 in view of Cloots et al., US 6,444,400 B1.

Re claim 14, The electrochemical transistor disclosed by Duthaler et al. includes all the limitations claimed except that organic material comprises a polyanion compound. Cloots et al. disclose an electroconductive material suitable for use in electrochemical transistors wherein the organic material comprises a polyanion compound (i.e. column 1, lines 35-49). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Duthaler et al. to include an organic material comprising a polyanion compound disclosed by Cloots et al. in order to increase polymerization rate of polythiophene.

Re claim 15, in the modified electrochemical transistor of Duthaler et al. the said polyanion compound is poly(styrene sulphonic acid) (i.e. column 4, lines 6-7).

8. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Duthaler et al., US 2002/0053320 A1 in view of Garnier et al., US 5,347,144.

The electrochemical transistor disclosed by Duthaler et al. includes all the limitations claimed except that the binder is a gelling agent selected from the group consisting of gelatine, a gelatine derivative, polyacrylic acid, polymethacrylic acid, poly(vinylpyrrolidone), polysaccharides, polyacrylamides, polyurethanes, polypropylene oxides, polyethylene oxides, poly(styrene sulphonic acid) and poly(vinyl alcohol), and salts and copolymers thereof. Garnier et al. disclose an electrochemical transistor with a poly(vinyl alcohol) as a binder (insulating organic polymer/dielectric) (i.e. page 2, line 55). Thus, it would have been obvious to one of

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ordinary skill in the art at the time the invention was made to modify the device of Duthaler et al. to include poly(vinyl alcohol) as a binder in order to improve quality of the carriers (i.e. column 2, lines 50-60).

Allowable Subject Matter

9. Claims 2,3,9, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claims 22-29 and 32-35 are objected to but would be allowable if rewritten. Claims 23-28 and 32-35 are objected to as being dependent upon an objected base claim. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not disclose a method making a supported electrochemical transistor wherein all contacts, electrode(s), electrochemically active element and electrolyte are deposited onto a support.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. Jonas et al., US 5,300,575 teach that polymerization rate in the presence of polyacids increase.

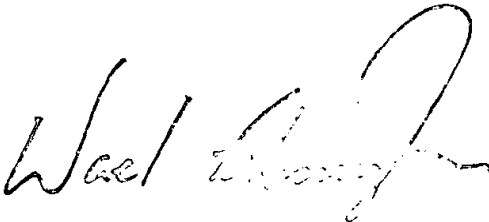
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aneta B. Cieslewicz whose telephone number is (703) 308-7607. The examiner can normally be reached M-F (8:00 a.m. - 4:30 p.m.).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached at (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ABC
December 23, 2002


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